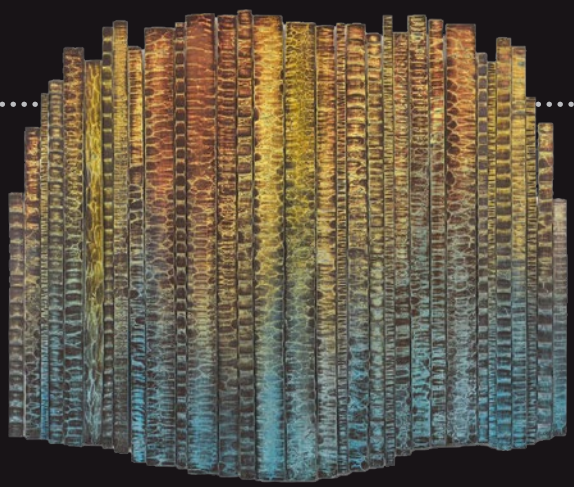
SPRING 2020 / VOL. 3 NO. 1

METALSMITH

SOCIETY OF NORTH AMERICAN GOLDSMITHS

TECH



CROSS CURRENTS

The Effects of the Trade War on Jewelry and Metal Artists

TECH TALK

Pushing the Boundaries of Powder Coat Painting

TECH TEACH

Polishing to Perfection

SNAG WOULD LIKE TO THANK THE MANY PEOPLE

Conference Coordinating Committee
Maria Eife, Caroline Gore, Rod McCormick, Rachel Smith, Mallory Weston

Adorned Spaces Coordinator
Joshua Kosker

Conference Educational Initiatives Coordinator
Rachel Smith

Conference Exhibition Committee
Alejandra Carrillo-Estrada (Co-Chair), Caroline Gore (Co-Chair), Elizabeth Essner, Bella Neyman, Marjorie Simon, Emily Zilber

Conference Programming Committee
Kristin Mitsu Shiga (Chair), Doug Bucci, Marilyn da Silva, Lindsay Mis, Seth Papac, Jessica Todd

Conference Student Scholarship Coordinator
Dan DiCaprio

Conference Volunteer Committee
Tabitha Ott (Coordinator), Paige Koenig

Design and Layout
Studio Us

Education Dialogue Committee
Rachel Smith (Chair), Courtney Gray, Patricia Madeja

Educational Endowment Raffle Coordinators
Marlene True (Chair), Talya Kantro, Hannah Oatman

Education Resource Room Coordinators
Tara Jecklin, Rachel Smith

Exhibition in Motion Committee
Sookyung Jun, Matt Lambert, Agnes Ma, Louise Perrone, Celina Zisman

Hospitality Coordinator
Meredith Tibjash

Juried Student Exhibition Coordinator
Agnes Ma

Student Digital Presentation Coordinator
Alejandra Carrillo-Estrada

Lifetime Achievement Award Committee
Perry Price (Chair), Boris Bally, Emily Stoehrer

Lifetime Achievement Award Designer
Cynthia Eid

Local Shipping Liaison
Bruce Metcalf

Meetings A La Carte
Kate Lichter, Sara Martinez, Betsie O'Neill

Nominations & Elections Committee
Andrew Kuebeck (Chair), Jessica Armstrong, Sharon Massey

Photographer
Micah Mackenzie

SNAG CONFERENCE 2020
GRIT TO GOLD
FUTURE FIFTY
PHILADELPHIA, PA

50 SNAG YEARS

WHO HELPED PLAN OUR 49TH ANNUAL CONFERENCE

Portfolio Review Coordinator
Alejandra Carrillo-Estrada

Pre-Conference Workshop Coordinator
Jera Lodge

Silent Auction Coordinators
Arielle Brackett, Tayja Danger

Tool in the Hat Coordinators
Dianne deBexeidon, Jane Richie

Tote Bag Coordinators
Doug Bucci, Mallory Weston

Trunk Show Coordinators
Carla Nessa, Pam Robinson

Sales Coordinators
Nora McMullen, Deanna Pastel

SNAG Stories
Sarah Rachel Brown

SNAG Interns
Alejandra Carrillo-Estrada, Kinszia Erickson

SNAG Staff
Adriane Dalton, John Garbett, Tara Jecklin, Gwynne Rukenbrod Smith, Kristin Mitsu Shiga

Special Events and Logistics Committee
Maria Eife, Mallory Weston

SPECIAL THANKS TO OUR CONFERENCE VENDORS

allcraftusa

GANGI GEMS

CHARON KRANSEN ARTS
Contemporary Innovative Jewelry
Books and Catalogs

CMA
Colorado Center for Metal Arts

Dikra Gem, Inc.

KING'S RANSOM
Betty Sue King Pearl Goddess and More

OTTO FREI
Quality Jewelry Tools & Findings Since 1930

PEPETOOLS
Precision Engineered Professional Equipment

RMS
Reactive Metals Studio Inc

RIO GRANDE
Since 1944
For your bench. At your side.

since 1898
T.B. HAGSTOZ

VILLAGE SILVERSMITH

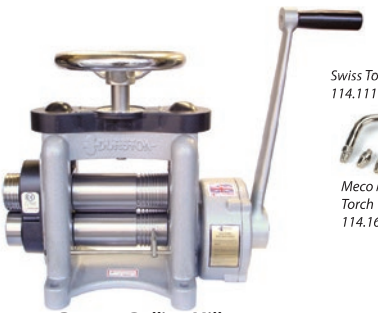
Tools & Findings You Will Love

Workbenches
013.001

GRS BenchMates

Genuine Swiss Made Files & Gravers

Ikohe Belt Sander



Durston Rolling Mills
128.118N
150mm Combo

Torches & Soldering Kits

Green Lion Saw Frame
149.695

Metals

Findings

save 5%

Right Now
Use Online Coupon Code

GFAR

Expires 9/30/2020

Shop Online & Save
800.772.3456
510.832.0355
OttoFrei.com

Otto Frei
Quality Jewelry Tools & Findings Since 1930

4 FOREWORD

6 HOW I BUILT THIS
The Power of Failure
Jeanette K Caines

10 TECH TOOLKIT
Crafting Anvils: Machining a Workhorse
Alison Antelman

CROSS CURRENTS
15 The Effects of the Trade War on Jewelry and Metals Artists
In an industry increasingly reliant upon imports, artists and suppliers face the challenges of ongoing trade disputes and disruptions. *C. M. Schmidlkofer*

TECH TALK
20 Pushing the Boundaries of Powder Coat Painting
The 2008 recession spurred enamelist Shana Kroiz to experiment with a new process as a way of expanding her customer base. *Velina Robinson Glass and Shana Kroiz*

TECH TEACH
26 Polishing to Perfection
When it comes to applying the perfect polish, having the right design plan is the first step. *Martha Glenny*

35-pound anvil with shop imprint.
Photo: Eric Smith

Cover:
- **Susan Madacsi**, Basalt Curtains of Black Canyon, 2018 (see p.18)
- **Shana Kroiz**, Undulating Wave, 2020 (see p.21)
- **Martha Glenny**, Ring, 1989 (see p.27)

Metalsmith is published by the Society of North American Goldsmiths

Artists. Designers. Jewelers. Metalsmiths.
www.snagmetalsmith.org

The Society of North American Goldsmiths advances jewelry and metalsmithing by inspiring creativity, encouraging education, and fostering community.

Editor
Adriane Dalton,
adalton@snagmetalsmith.org

Contributing Editor
Kate Hensler Fogarty

Graphic Design
Heather White,
Pixel37 Design

Advertising
John Garbett,
jgarbett@snagmetalsmith.org

SNAG Board Of Directors
President
Brian Ferrell
Secretary
Becky McDonah
Treasurer
Michael Brehl

Theresa Baybutt, Dominique Bereiter, Kat Cole, Dianne deBeixedon, Jeff Georgantes, Anne Havel, Nicole Jacquard, Patricia Madeja, Elizabeth Shypertt, Emily Stoehrer, April Wood, Kee-ho Yuen

Printer Freeport Press, committed to using environmentally friendly materials and methods.

Metalsmith (ISSN 0270-1146) is published both in print and digital formats in February, May, August, and November by SNAG, PO Box 1355, Eugene, OR 97440, 541.345.5689, www.snagmetalsmith.org.

Membership rates: $94/year and up, full membership includes four-issue subscription to *Metalsmith*. Special rates available. Subscription to only *Metalsmith*: $33/year and up.

Postmaster/Members/ Subscribers/Copies
Metalsmith is not forwarded by the post office. Send all address changes and any other requests, including missing issues, to SNAG, PO Box 1355, Eugene, OR 97440, 541.345.5689, info@snagmetalsmith.org. Claims for missing issues are accepted only if received within three months of publication.

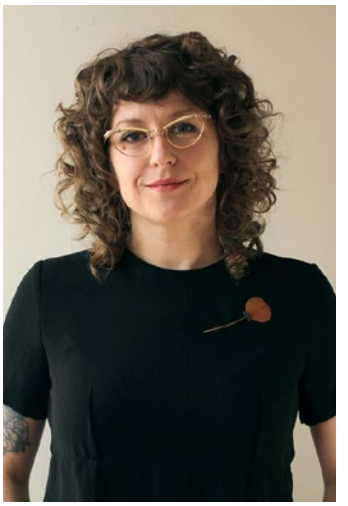
The opinions expressed in *Metalsmith* are those of the authors and not necessarily those of the staff or directors of SNAG or *Metalsmith*.

Metalsmith is indexed in the Art Index and EBSCO Media. Newsstand distribution: COMAG Marketing Group, 155 Village Blvd, Princeton, NJ 08540.

Copyright 2020 by Society of North American Goldsmiths, all rights reserved. Reproduction in whole or in part without written consent is prohibited.

Printed in the U.S.A.

FOREWORD



Recently, while I was half-awake in the middle of the night, the word *adaptability* popped into my head, prompting me to stumble through my dark apartment and scrawl some notes on the junk mail on my desk. It wasn't exactly one of those oft mythologized "eureka!" moments. It was more of a moment of clarity amid a cloud of uncertainty. In fact, I suspect that many of us these days are having moments when a thought that comes easily under normal circumstances now feels inaccessible—but when it finally gets through, it feels like a jolt of electricity.

The term *adaptability* is a fairly didactic way of contextualizing a highly nuanced practice that makers are well versed in: processing the information of struggle in a way that results in growth. Times of crisis tend to hone an artist's dexterity for creative problem-solving and ability to adapt. This has been the case for jewelry artist Shana Kroiz. In a jointly written article with Kroiz, Velina Glass Robinson explores how Kroiz weathered the Great Recession by rethinking her process and price points. Alison Antelman profiles Cliff Carroll, who pivoted from a career as a farrier to one as a maker of high-quality anvils. Author C.M. Schmidlkofer surveys the state of imports and exports, and talks to artists and suppliers about how they are adapting to rising prices and the uncertainty of material availability. The second installment in Martha Glenny's series on polishing includes some key considerations for getting a perfectly polished surface. One important aspect? Adapting your design to better anticipate the desired finish. In her essay, Jeanette K Caines speaks frankly about an important and necessary tool on the path toward mastery: failure.

Persevering through challenges is a profound act of faith. Indeed, the COVID-19 pandemic required that we move this issue of *Metalsmith Tech* to a digital-only format on relatively short notice. For digital subscribers, this change isn't notable. But for those accustomed to the print edition, I hope that the increased accessibility of links to supplemental videos and other content provided in the digital format will ameliorate your experience. Thank you for bearing with us as we make this abrupt change, and work to enhance the reader experience of *Tech*.

In the spirit of community, I invite you to share how the current situation is causing you to adapt in your community, practice, business, or as an individual. Please reach out and let me know what is happening wherever you are: (editor@snagmetalsmith.org).

—Adriane Dalton, Editor

The mission of *Metalsmith Tech* is to focus on techniques, processes, educational philosophies and ideas, professional development topics, and new technology in the field of jewelry and metalsmithing. The magazine will include both contemporary and historical references, highlighting a diverse range of approaches to jewelry design and metalwork, including professional practices, creative influences, and new trends.

We Get It.

Shop at HalsteadBead.com for so much more than beads.

You'll find a huge selection of sterling silver chain, findings and settings. Need great materials, rapid turnaround, informative articles and outstanding service? Ask around and find out why Halstead customers love working with us.

We get it.

Halstead™
QUALITY JEWELRY SUPPLIES ON DEMAND.

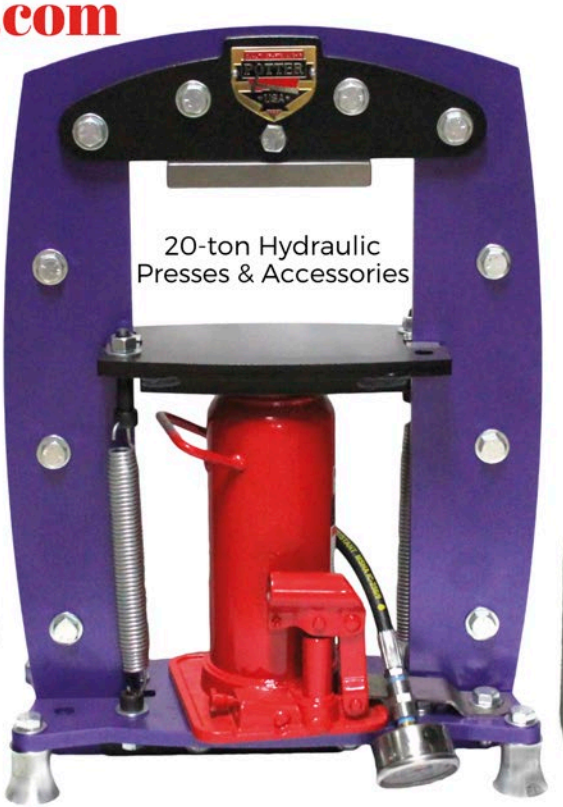
$100 MINIMUM | HALSTEADBEAD.COM | 800.528.0535

POTTER USA

PotterUSA.com

Impression Dies

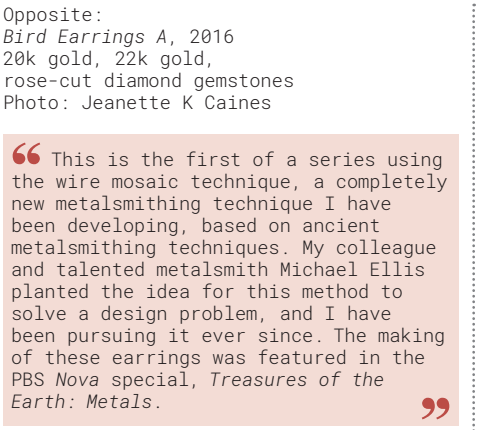
Pattern Plates



20-ton Hydraulic Presses & Accessories

Pancake Dies

Fine-silver Stampings



Opposite:
Bird Earrings A, 2016
20k gold, 22k gold,
rose-cut diamond gemstones
Photo: Jeanette K Caines

“This is the first of a series using the wire mosaic technique, a completely new metalsmithing technique I have been developing, based on ancient metalsmithing techniques. My colleague and talented metalsmith Michael Ellis planted the idea for this method to solve a design problem, and I have been pursuing it ever since. The making of these earrings was featured in the PBS *Nova* special, *Treasures of the Earth: Metals*.”

HOW I BUILT THIS

The Power of Failure

A seasoned instructor highlights how major meltdowns can lead students toward technical breakthroughs.

BY JEANETTE K CAINES

Failure.

The very word conjures up a cold sense of dread in the pit of your stomach. Failure gets tangled up with feelings of shame, loss, and anxiety—feelings that humans naturally try to avoid, and I’m no exception. In my ongoing journey to metalsmithing mastery, I’ve learned the paradoxical truth. Failure is my best friend and secret weapon. I took my very first jewelry class at Jewelry Arts Institute (now Jewelry Arts Inc.) when I was twenty-one years old, and I was instantly hooked. I didn’t know then that I would stay at JAI as a student for two years, and beg my way into an apprenticeship for another two. I was hired as an instructor in 1996 and became Director in 2009. I bought the studio in 2017.

I was incredibly fortunate to find my passion and place at a young age. All I knew at the time was that I was in love with a difficult-to-please lover. Metals and gemstones demand that you learn what they need and require before they will consider giving you what you want. What I wanted was for the metal to execute my designs and follow my dictates. This seemed like a fair exchange to me, but the reality was something I realized slowly, along the way. Since my only goal was to become a master someday, I tried to learn what my materials demanded. In my mind, a master controlled their process and made the materials produce their design, rather than letting the materials dictate the outcome of their piece. A common personality trait among metalsmiths is the desire for control; guilty as charged. When I was a student, Bessie Jamieson, my former instructor and boss, would often come by my workbench and suggest, “That’s kind of ambitious, isn’t it?” I always replied with some version of, “It might, be but if I melt it all, don’t worry; I won’t cry.” She usually shrugged and left me to push the envelope. That was a lie; I did cry a few times, but I hid in the bathroom first. I used to design everything as earrings and end up with pendants, since only one of the pair would survive. The longer I practiced, the better I understood the need for symbiosis. Without a deep understanding of my materials, I would never get them to perform the way I wished.

The time and emotional space to learn from failure is built into every step of the curriculum at JAI. It is essential for every student’s eventual success. There is a yawning void in metalsmithing education where room for destruction and experimentation should be. As instructors, it is important that we teach our students the skills and thought processes necessary to create a multitude of pieces over their life, not just the piece at hand. All of the skills I have today I owe to understanding that my goal should not be the completion of any one project. Projects will come and go, but your skills and knowledge stay with you forever.

My goal is to be a better metalsmith tomorrow than I am today, so I keep expanding my knowledge, trying to improve. I always test methods to determine which is the best for any process. When I was a new student, I read a book written by a master silversmith, the title of which I have sadly long forgotten. The author explained that before he worked on a major vessel, he ran tests and

Ring, 1994
Sterling silver, 22k gold,
garnet gemstone
Photo: Jeanette K Caines

> “I worked in silver for two years before I attempted working in gold. I was excited and nervous to work in gold, so I started with something simple, just a gold bezel with a silver shank. I’m sure you can easily see all the mistakes: bezel misaligned on the shank, stone set too low. No angels sang when I completed it; I had no illusions about it being a masterpiece. The most important thing about this and all my other early pieces was that for every mistake I made, I resolved to do better next time.”

made samples using the techniques he was trying to achieve. I remember thinking, (in my elegant New Jersey vernacular) “Screw that! I just want to make my piece.” I wasn’t quite ready then to embrace the master’s mindset. However, as time went on, I realized how very wise his suggestions were. If you are pushing your boundaries to create your best possible work, you will face destruction, terror, and mayhem. Regularly.

Failure allows you to understand a material’s requirements more deeply. When you are dealing with the physical world, failure is your surest route to knowledge. The time I spent making and remaking pieces I destroyed as a beginner built the foundation of knowledge that sustains me today. You may be focusing on the parts of the process that aren’t as important and neglecting the most essential. Logic will only take you so far, because you will find that many decisions based on seemingly sound logic will fail. This is because as beginners we do not truly understand the actual mechanics of soldering, fusing, construction, etc. The physics and chemical reactions of a process are often very different than we think. The reason I can help a student differentiate between the way solder looks when it is about to melt and the way the entire piece looks when it is about to melt is because of the many times I pushed my pieces to the brink of destruction, and beyond. That information is incredibly valuable and I use it every day. To do only as your instructors teach will allow you to go only so far. Eventually, you need to understand the why and how of processes for yourself, or your progress will be stunted.

A few years ago, the State of New York wanted Jewelry Arts Institute to become accredited. We would have had to change our central principle of allowing each student to progress at their own pace. All students would have to complete the same projects, at the same speed, and receive grades on how quickly they accomplished them. I was adamantly

Rubellite Earrings, 2010
20k gold, 22k gold, rose cut sapphire
and Rubellite Tourmaline gemstones
Photo: Jeanette K Caines

To give just one example of the innumerable ways failure has made me better and smarter, around twenty years ago, I was trying to execute my design for these cross-based earrings. I kept having to melt down my results, because no matter how much I looked at things from every angle before I soldered, my elements weren’t well aligned.

I tried over and over until I realized my eyes just weren’t all that trustworthy. Often additional practice is all that is needed to improve, but my ability to see if elements were straight stayed stubbornly the same. I would arrange everything with a ruler on my soldering board and all would be well. I would think everything was correct, but when applying solder, my elements would move just slightly out of alignment, and without the ruler to compare to, my elements were soldered on crooked. Just enough to ruin the effect.

Since my eyes weren’t getting any better at my task, my method needed to improve. This project is a perfect illustration of how

The time and emotional space to learn from failure is built into every step of the curriculum at Jewelry Arts Inc. It is essential for every student's eventual success.

opposed to reinforcing the concept that project failure meant student failure. I fought the change, and eventually we came up with a compromise. We removed the word "Institute" from our name and became Jewelry Arts Inc. Failure has done so much for me as an artist; I couldn't let our students lose their access to their greatest ally.

I had wonderful teachers at JAI, and there were many talented metalsmiths there to inspire me. I can look back now after thirty years of metalsmithing and understand that my very best teacher was, and remains to this day, failure. Failure always showed me where I misunderstood or misapplied important principles. Eventually, as my proficiency improved, enough testing and failure in the studio taught me what the flaws were in traditional metalsmithing lore, and enabled me to apply better, more useful information to my own work and to that of my students. I wrote my book, *Soldering Demystified*, based on all the myth busting and experimental failure I pursued in the studio. I'm working on a second book on bezel settings, and all of my failures using conventional studio techniques have greatly informed my practice. Don't let the traditional, negative connotations of failure stop you from embracing your most valuable tool.

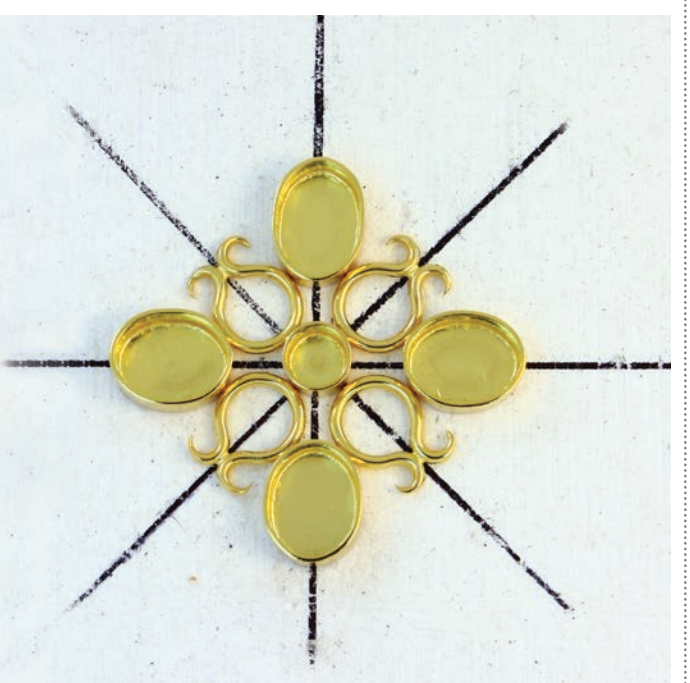
Jeanette K Caines is a Master Goldsmith with over 28 years' experience. She is the Director and owner of Jewelry Arts Inc., a jewelry school in New York City teaching ancient jewelry making techniques.

Compass Ring, 2018
20k gold, 22k gold, chrysoberyl and zircon gemstones
Photo: Jeanette K Caines

"This is one of my favorite pieces made just last year. For me, it illustrates how far I've come since my first gold ring, and how much more progress I hope to make before they pry my gold out of my cold dead hands. The true north of my compass always points to gold."

we all often expect perfection out of ourselves instead of thinking first of how to adjust our tools and methods to help us succeed. Finally, the idea to draw straight ruled lines on my soldering board with a ball point pen came to me. Like all very simple ideas, my next thought was, why the hell did it take me so long? I learned from using this process that the human eye is great at estimating alignment if there is something straight to look at, and fairly lousy at it if there isn't.

Even more valuable, this process taught me to critically analyze my process for ways to improve, rather than just blindly reusing the methods I was taught and expecting them to be sufficient for my needs.



Process shot of *Rubellite Earrings*
Photo: Jeanette K Caines

"Just a few lines on my soldering block in ball point pen is all it took to solve my soldering alignment problems. I never would have thought of the solution if failure hadn't shown me the way."

TECH TOOLKIT

Crafting Anvils: Machining a Workhorse

A farrier turns to the foundry, making a life machining anvils suitable for a jeweler's studio or the stable.

BY ALISON ANTELMAN

"There are more styles of horseshoes than there are of women's shoes," Cliff Carroll remarks,[1] in his workshop and retail store in Larkspur, Colorado, south of Denver. We're surrounded by large equipment, and the whir and buzz of a working metals shop. It's hot inside, so all of the garage doors are open, letting the soft breeze of the Rocky Mountain summer air waft through.

The ten-acre property is composed of a series of small industrial buildings and a residence. Separate buildings house each part of the business: welding and painting, packing and shipping, and machining and finishing. There is also a store that sells horseshoes, small horseshoe forges, anvils, anvil stands, hammers, and other small tools. Forges, anvils, and stands are made on site. At about one foot diameter by two feet long, the forges are small enough for traveling and well insulated; I imagine you could tuck one under your arm. The shop makes two types of anvil stands: a basic metal model with room for tools, and an elegantly designed wooden traveling anvil stand with adjustable legs, perfect for the jeweler with a tool fetish.

Cliff Carroll grew up in Montreal. He went to a farrier's school in the 1960s on for two months before setting out on his own.[2] But realizing he wasn't good enough, he apprenticed with a horseshoer at a

Above left:
Cliff Carroll with a 35-pound anvil fresh from the foundry.
Photo: Eric Smith

Above right:
Two anvils on the surface grinder with grinding wheel in motion.
Photo: Eric Smith

Left:
Cliff Carroll moving an anvil from the grinder to the next stage.
Photo: Eric Smith

race track in Ontario, learning the skills he needed. By shoeing twenty horses a day for three years, he learned trimming, fitting, and dressing horseshoe stock. He then began working on racetrack horses in Florida, and spent twelve years shoeing for all of the big races, including the Kentucky Derby. Racehorses need new shoes every thirty days. With this need for frequent reshoeing, and no allowance for margin of error in the process, Carroll had both a brisk business and the reputation to follow. As he hit the pinnacle of his career, he felt ready to move on and achieve something else. He decided to go into the tool business.

"Best way to make an anvil? I know of fifty ways *not* to," Carroll smiles, with the confidence that comes from many years of experience. His anvils are cast at local foundries, using a mix of elements that give the metal the right type of hardness. The foundry grinds down the sprue, and Carroll's shop starts from there. The anvils are ground and machined at the casting seams as well as at the horn, all by hand with an angle grinder. The surface grinder mills two anvils at a time, using a grinding wheel with a coolant, making the top perfectly flat, and revealing a smooth, bright surface. As I watch the machine gliding over the anvil, I'm amazed at how quick the transformation is from rough to smooth. The anvil is then flipped over and milled on the bottom. The shop has a series of processes in order of sequence already set up for the size anvil they're machining; 125, 70, or 35 pounds. As Carroll demonstrates, he remarks, "If you make something that functions and is beautiful, it's a wonderful combination."

Now the top of the anvil is ready for tempering. Only the surface is heat-treated, leaving the base to absorb hammer blows without ringing. Throughout the years, they've created rigs to move heavy items. The anvil is moved onto a pulley and brought over for annealing. A wide flame brushes over the surface, followed by a trail of water quenching it at just the right

"Best way to make an anvil? I know of fifty ways *not* to," Carroll smiles, with the confidence that comes from many years of experience.

Left:
Anvils finished and ready for shipping.
Photo: Eric Smith

Below:
Larry Huff hoisting a finished anvil. They've devised a variety of ways to move the anvils without injuring their backs.
Photo: Eric Smith

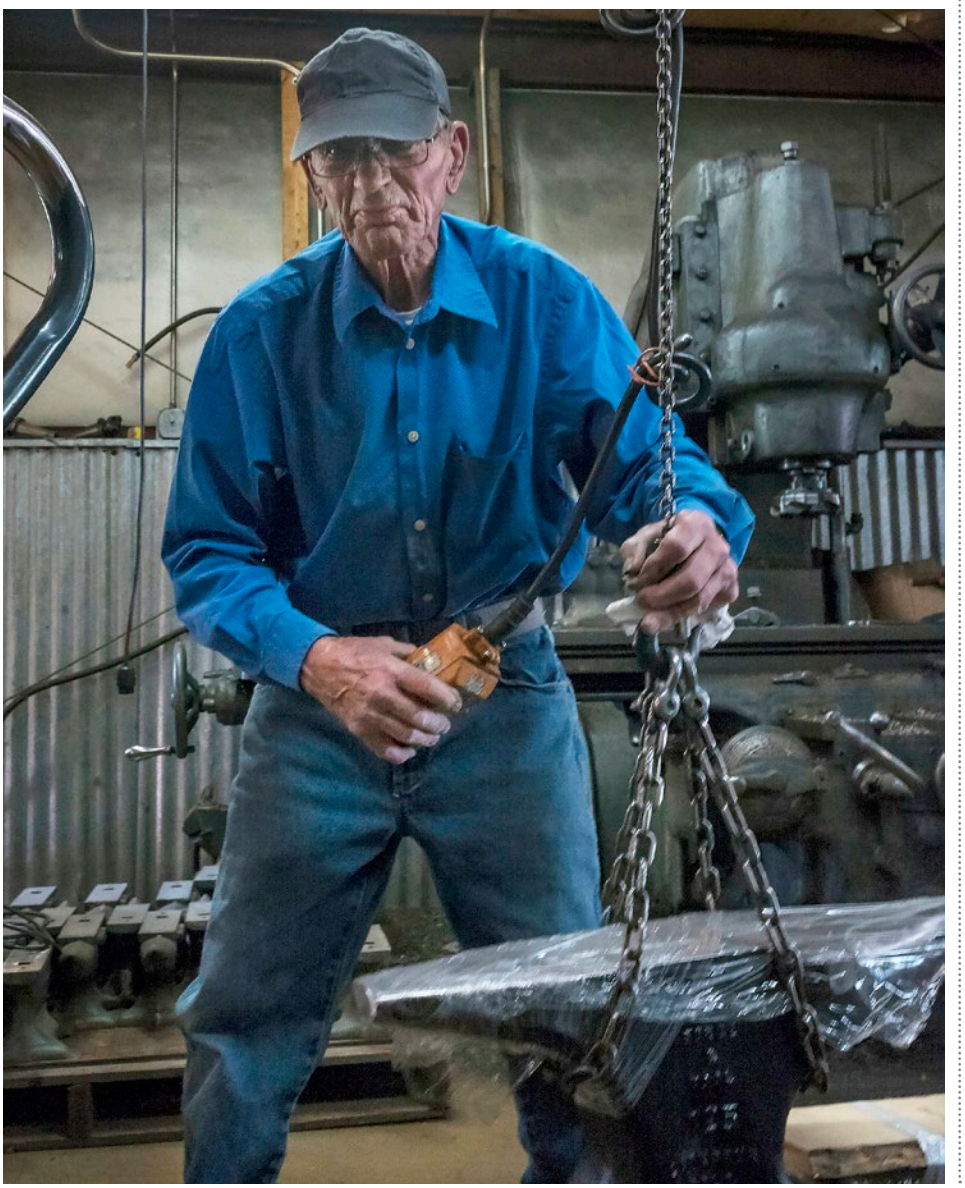
temperature for proper hardness. The machine is calibrated and set automatically, creating the exact temper for the metal of 50 Rockwell hardness. This too, is done one anvil at a time. The anvil gets its final polish and is ready for shipment or pickup.

Once while teaching a workshop, I noticed that my students instinctively used two nubs on the side of Carroll's anvil to gently bend tubing. I learned from Carroll that they are a signature of his anvils, called Turning Cams. They allow horseshoers to bend the shoe at the right curve. The two nubs protrude from the anvil with a small distance between them to give just the right amount of leverage to get a good curve.

From Carroll and his long-time colleague Larry Huff, I learned that this is a thriving business, and they can't make the anvils fast enough. Cliff is seventy-two and Larry seventy-four. I asked if they'd have an apprentice. They've tried. "This is not a job just for the paycheck," Cliff surmises. "When you get good at it, you feel good, you've got a sense of satisfaction. When you get that return, it's a great feeling."

Alison Antelman is a metalsmith, educator, and writer in Berkeley, California.

Cliff Carroll's Horseshoers Supplies, Inc.
245 W. Perry Park Ave., Larkspur, CO 80118
proforge@aol.com • 303-681-2643
www.cliffcarroll.com



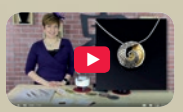
1 Cliff Carroll interview, June 27, 2019, in Larkspur, Colorado. / **2** A farrier is a person who makes horseshoes and shoes horses.

Versatile Bench-top Kilns

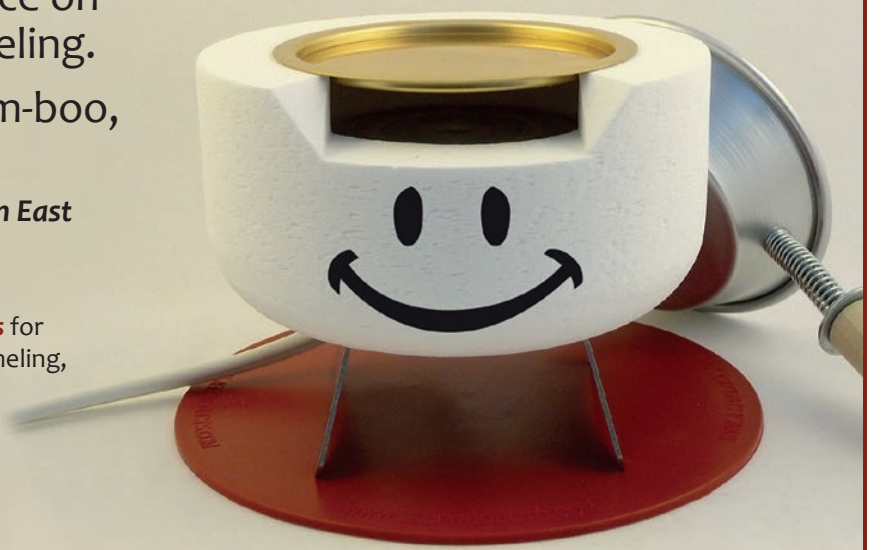
"I really like the larger surface on the studio model for Enameling.

And when it comes to Keum-boo, I won't use anything else."

–Pam East



Visit ***UltraLiteKiln.com/videos*** for tutorials on Keum-boo, Enameling, Granulation, and more.



UltraLiteKiln.com

JEC Products®

CAD, CNC, 3D PRINTING, MOLDING, PATTERNS, CASTING, FINISHING, SETTING.

NEW CUSTOMERS: FIRST PRINT *FREE.*
MENTION THIS AD.

800-637-CAST

AU enterprises

PRIVATE LABEL MANUFACTURERS

William Richardson
Zendo 14, 2018
Painted steel
19 x 16 x 4 in.
Photo: William Richardson

CROSS CURRENTS

The Effects of the Trade War on Jewelry and Metals Artists

BY C. M. SCHMIDLKOFER

In March 2018, a collective shiver ran through the souls of metal artisans and suppliers over the news that imminent tariffs would be applied to US steel and aluminum trading partners. China, Canada, Mexico, South Korea, and the European Union were targeted, with proposed tariffs of 25 percent on steel and 10 percent on aluminum. It seemed unavoidable that the bottom lines of the businesses that rely on imported steel and aluminum would be negatively impacted.

The announcement was the latest pull in a tug of war between the United States and affected importing countries. The latter retaliated with increased tariffs of their own on US imports, not only on metals, but on a wide range of goods, including solar panels and washing machines. The back-and-forth continues to this day, despite a December 2019 halt on further increased US tariffs for China, in anticipation of negotiations on their trade practices.

Meanwhile, artists and suppliers interviewed in November and December of 2019 reported being forced to make tough business decisions due to the tariffs. "I did purchase some stainless steel earlier this year and was quite shocked at the price," said Idaho artist Susan Madacsi, adding that an order of structural tubing was unusually costly as well.

Madacsi has been creating colorful steel vessels and wall, sculptural, and conceptual art for the past nineteen years. She uses traditional blacksmithing techniques, then finishes the pieces with enamel paint for a colorful touch. Madacsi buys from both large and small US suppliers, and while both have raised prices, the smaller supplier told her that the increases were a direct

Opposite:
Heather George sells bracelet blanks in 16-gauge red brass, 16-gauge copper, and 14-gauge aluminum through her online store, The Cracked Talon.
Photo: Heather George

result of the tariffs. "My big supplier (Pacific Steel) has marked up steel, but it doesn't seem too bad, and hasn't been a hardship on me," she said. "They mark up according to the market." The subject of tariffs forced her to reappraise her pricing, though she adds that it coincided with price increases she was thinking of implementing anyway.

North Carolina metal sculptor William G. Richardson says he has not experienced serious challenges purchasing steel for his Zen-based, minimalist geometric sculptures, nor is he concerned about them. "For me, the impact has been minimal so far," he said. "Part of the reason is that I have an existing stock of materials already on hand, and I use non-embargoed vendors." Richardson began working with steel in 1971, primarily in large-scale outdoor installations. His sculptures—which use a variety of steel stock, including I-beams, H-beams, angle irons, as well as steel plates, channels, and bars and other stock—are included in private collections, and public installations, such as his *Architectural Gateway*, situated at the University of North Carolina.

William Richardson
Zendo 22, 2019
Weathered steel
15½ x 6 x 10 in.
Photo: William Richardson

Richardson relies on local recyclers for his materials, which are steadily replenished with industrial metal scrap from all of the new high-rise construction in his area. "In the case of recycled metals, the increase in cost is minimal," he said, adding that he tacks increases onto his sales price, be they due to tariffs or other factors. He avoids increases in the price of welding rods and bolts by shopping competitive vendors. Richardson said it is challenging to know exactly where steel comes from today, as cut pieces no longer have the manufacturer name stamped on them, and some distributors carry foreign steel, which may not be marked. "There is plenty of US-made steel available in my area through both distributors and recyclers," he says. In fact, Richardson noticed a price decline in 2019 for steel.

"It's not just material, it's tools as well," said Chicago-based jeweler Lerry Pollack. "China pretty much makes everything we need in the US because we're not making it anymore, or US companies source it out." Pollack has been making unorthodox object aluminum and polycarbonate jewelry since 2009, which he sells online exclusively. His contemporary pendants, earrings, rings, and chains are labors of love, and he makes each one-of-a-kind piece by hand.

While the jewelry is not his only source of income, Pollack said he felt the need to raise his prices by a few dollars after noticing the increase in aluminum prices about six months ago. He is relying on his stock supply to carry him through the tariff war, purchasing aluminum from online suppliers when needed. He plans to limit his production output if aluminum prices continue

Lerry Pollack
Dimple Medallion, 2019
Aluminum
⅝ x ¼ in.
Photo: Lerry Pollack

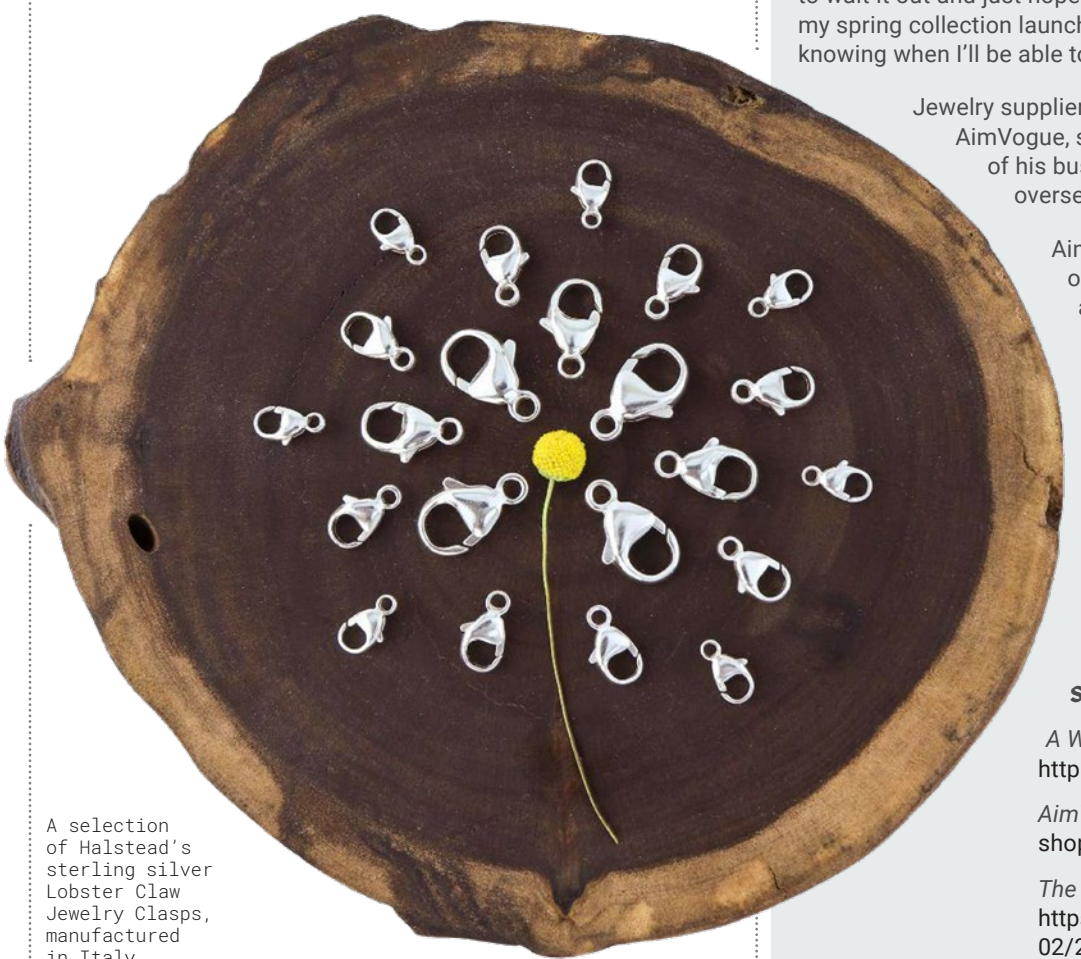
In addition to struggling with increased supplies due to tariffs, Heather George fears that in some cases prices are being increased without evidence of tariffs.

to climb. Unlike artisans who require large amounts of metal, such as sculptors, Pollack's metal needs are small enough that he isn't overly concerned about the tariffs.

Metal suppliers are feeling the pinch as well, in some cases shortages of some metals. Hilary Scott, president of Arizona-based Halstead, a wholesale findings supplier for jewelers, said her metal prices increased in 2019 from imports from a number of countries. A family business founded in 1973, Halstead is now run by Scott Halstead and employs thirty full-time employees. They provide not only a complete selection of jewelry findings, but raw materials including wire, sheet, and solder, as well as gold-filled, copper, pewter, brass, and 14 karat gold.

Half of Halstead's product line is sourced in the United States. "We source very little out of China, so the impact of this specific conflict is minimal," she said. "However, we source much more from India and Turkey." Once exempt from tariffs, India and Turkey were stripped of their preferential treatment in 2019, which means Halstead pays more for its products, and those increases are in turn are passed on to her customers. "Most customers are raising their prices as well, and know exactly why changes are necessary," she said.

Heather George, owner of California-based The Cracked Talon, has supplied brass, aluminum, and copper bracelet and ring blanks through her online site to artists since 2014. "Aluminum has gone up to almost one and a half times the price per bulk I was paying," she said, adding that brass and copper had become scarce and of



A selection of Halstead's sterling silver Lobster Claw Jewelry Clasps, manufactured in Italy. Photo: Bethany Blackshear

COVID-19 VIRUS ALSO IMPACTING OVERSEAS SHIPPING

Compounding difficulties of shipping delays from China and other countries due to the trade war are added postponements due to the COVID-19 virus, or Coronavirus.

Factory closings, quarantines, and roadblocks in China have prevented goods getting to the docks for international shipping, according to *The New York Times*.

Laura Michael, founder of A Worthy Brand, said shipments of metal supplies used to make her jewelry and hair pins normally took three to five days to reach her in Phoenix. Today her orders are delayed by several weeks, forcing her to extend her processing time to customers.

"Some suppliers aren't even open for business right now," she said. "Also, some Swarovski crystals have been hard to get."

The crystals are a component of her crystal hair clips, gemstone hair pins, and hair combs. They are purchased from a US supplier, while the hair pin bases come from overseas.

"I'm unable to create some new pieces I had planned because I cannot get the supplies," she said. "So I'm having to wait it out and just hope I'll get them soon. This affects my spring collection launch and I've had to extend it, without knowing when I'll be able to release them."

Jewelry supplier Steve Leonard, co-owner of AimVogue, said approximately 20 percent of his business has been impacted by overseas shipping delays.

AimVogue, located in Los Angeles, offers jewelry components from all over the world to its resale customers online.

Currently, restocking is taking three to four weeks, he said.

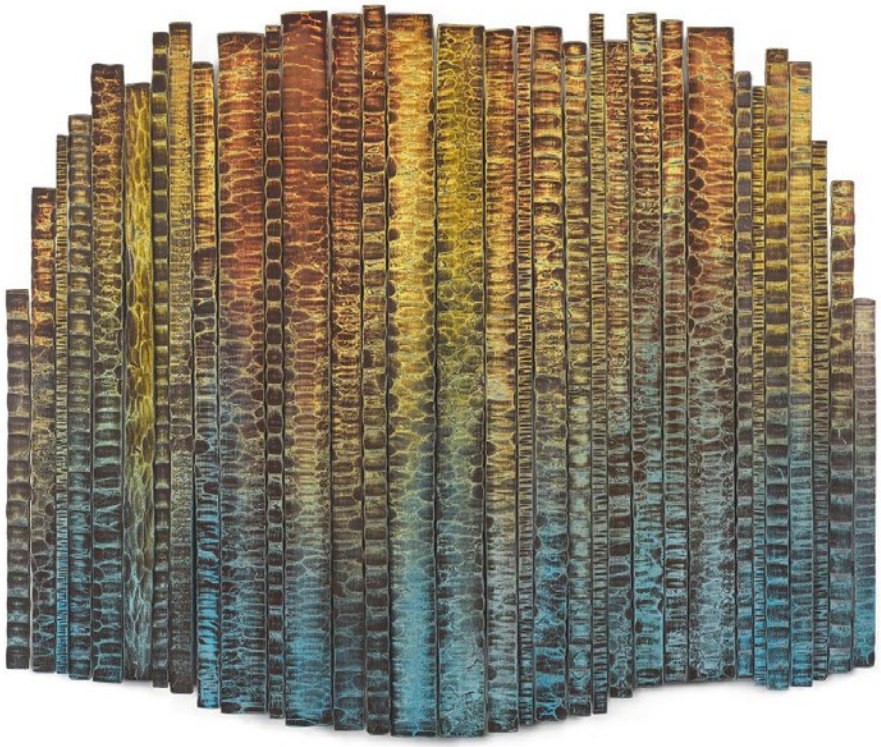
"We have a good inventory on most of our product," he said. "Some of my big customers have stocked up on some supplies. They are afraid that they will run out."

Sources:

A Worthy Brand: https://aworthybrand.com

AimVogue: https://www.etsy.com/shop/AimVogue

The New York Times: https://www.nytimes.com/2020/02/27/business/economy/china-coronavirus-shipping-ports.html



Susan Madacsi
Basalt Curtains of Black Canyon, 2018
Forged and fabricated steel with aerosol enamel paints, wax
29 x 24 in.
Photo: Pete Grady

Below:
A selection of Halstead's sterling silver and gold-filled chain, manufactured in Italy and the US.
Photo: Bethany Blackshear

poor quality when she could find it. She's struggled to keep her prices down for the sake of her customers, who are for the most part independent artists starting their own metal stamping efforts, or retailers who have brick and mortar stores.

"I have done only a couple price raises in the last year, not steep enough to make people upset," George said. "I try to work with people if they order larger amounts."

In addition to struggling with increased supplies due to tariffs, George fears that in some cases prices are being increased without evidence of tariffs. "I was told that some of the aluminum I purchased was obtained locally this last time, not from overseas, yet my price is still just as high," she said. "So it does make me think we are being taken advantage of a bit when metal is still obtained locally."

Asked if she has concerns about the trade war affecting her prices no matter where they come from, she thinks that is already an issue now. "Will it get worse? I hope not."

China and the United States reached an agreement in December 2019, canceling a proposed additional 15 percent duty on some Chinese imports that were to become effective at that time. The Phase One trade deal, signed by President Donald Trump on January 15, requires China to restructure the economic and trade practices that brought about the trade war to begin with including its intellectual property, financial services and technology transfer policies.

To ensure the terms of the Phase One trade deal are followed, a restructured dispute resolution system will prevent delays in enforcement if needed. No details as to what Phase Two might entail are known.

While relieved that the additional tariffs did not go through, artists and suppliers still have to contend with the current taxes. "I occasionally read up on the trade war," Pollack said. "It's not something I obsess about that much. There's nothing I can do about it, other than not vote for Trump in the next election. That the White House is cutting back environmental policy and ignoring climate change worries me much more than the trade war."

C. M. Schmidlkofer is a journalist reporting for newspapers and national magazines. She's written for the Chicago Tribune, *the* Crafts Report, Fibromyalgia AWARE, National Paralegal Reporter, Professional Artist *and* Stone Voices.

Hauser & Miller
PRECIOUS METALS SINCE 1909

Supplying quality precious metals to metal artists and the jewelry industry for over 100 years.

REFINING SERVICES:
- Refining Scrap
- Also accepting "as-is" Metal, Gold, Silver, Argentium, Platinum and Palladium

FABRICATED METALS:
- Casting grain
- Flat sheet
- Tubing
- Wire
- Bi-Metals
- Bullion
- Solders

www.hauserandmiller.com
To place an order: **800-462-7447**

A&A JEWELRY SUPPLY

THE SOURCE FOR:
- Tools
- Supplies
- Findings
- Displays
- Packaging
- Lighting

Mention this ad and receive **$10 off** your order of $100 or more, or **$50 off** your order of $400 or more.

www.aajewelry.com | 213.627.8004 | orders@aajewelry.com

TECH TALK

Pushing the Boundaries of Powder Coat Painting

BY VELINA ROBINSON GLASS

Baltimore-based enamelist, educator, and jeweler Shana Kroiz has effectively navigated the challenges of generating profitability while maintaining her creative voice.

Shana Kroiz
Swoop Earrings
Hand carved in wax, electroformed in copper, transparent enamels and 24k gold foils, 18k vermeil, hand-fabricated 18k findings.
2¾ x 1 x ¼ in.
Photo: Hap Sakwa

Shana Kroiz
Undulating Wave, 2020
Electroformed copper, powder coat, 24k gold leaf
Photo by the artist

In 2009, when faced with the Great Recession, Shana Kroiz entered the fine craft show market, which required her to develop a production line with a broad range of price points suitable for high-end craft and museum shows.

As she needed to find a production method that could accommodate the colorful, curvilinear aesthetics of her enamel jewelry at a mid-range price point, Kroiz observed other instructors at the Baltimore Jewelry Center and their students using powder coat paint.[1] She was curious about its possibilities, and struck by its similarities to vitreous enamel. Kroiz envied the colors, durability, and the lightweight finish, but was unsure if the industrial appearance that resulted was right for the organic shapes in her work.

Inspired by aquatic life, Kroiz's designs use curvilinear shapes resembling tentacles. She decided that a pair of earrings with a simple white and gold palette was the ideal place to begin her exploration."I never designed earrings in my one-of-a-kind jewelry because I felt I needed a broader surface," she says. But the *Swirl* earrings were her first success, and became the linchpin of her production line.

Despite this early victory, Kroiz found the usual methods for powder coat application fraught with problems. When using the spray gun in a booth erected from plastic drop cloths, the spray gun leaked powder throughout the fume tent, which presented a problem when working in multiple colors on the same surface. Once a color was applied, the plastic had to be replaced and the gun thoroughly cleaned so that not one speck of the very fine powder was left behind to potentially ruin the piece. It took hours to clean the gun and replace the booth before moving on to a second color.[2]

The excessive prep and cleanup time spurred Kroiz to experiment with using the powder paint in a process similar to the one she uses when working with enamels. Using mesh enamel sifters, she applies powder coat paint one layer and one color at a time, and fuses the paint in a toaster

Struck by powder coat paint's similarities to vitreous enamel, Kroiz envied its colors, durability, and lightweight finish

LEARNING CURVE

Shifting from Enamel to Powder Coat

BY SHANA KROIZ

I create metal forms first by carving in wax, electroforming in copper, melting out the wax, then soldering any findings or details needed. Then I apply a base coat of opaque or transparent powder coat, and sometimes a combination of both. I fuse gold and/or silver foils to the surface to create the pattern and some texture, along with adding the element of precious metals in conjunction with the rich colors from the powder coating.

I started using the powder gun with magnetic fusion. Over time, I have decided that hot flocking is much better for my purposes, because of the mess that the sprayer's powder coat creates compared to sifting.[1] As an enamelist, the sifting feels more natural and comfortable. Despite the claims that powder coating is nontoxic, I do not feel comfortable with the powders floating in the air, and feel the loose powders are much more controlled by sifting.

Honestly, it was an easy transition because powder coating is a fairly straightforward technique that shares many similarities to enameling. I learned a lot through practice and mistakes.

For instance, I learned that getting an even, clear surface with metallic colors is much more difficult. The metallic powders separate and can create undesirable surfaces if you do not use a fluidizer, a tool that mixes the powders while they are being sprayed.

I also learned that there is a limit on layers, and that the thicker the colors get, the more problems with surface imperfections and dulling. Unlike with enamels, more heat does not smooth out the color. It causes the paints to go matte and become dull. If you make a mistake, the powder coating needs to be completely removed before starting over. Conversely, if there is a problem with a surface while enameling, the enamels can be ground down a bit with an alundum stone and you can continue.

I have spent a lot of time experimenting with fusing gold and silver foils into powder coating. Silver is more problematic than gold, because if there are any air bubbles between the foil and the base coat, the powder coating erupts and gets a very undesirable rough surface. The use of foils is where I have spent most of my time experimenting, and time plays a crucial role in the success of this technique, particularly when getting the initial foils fused in place before the metal cools.

"I learned that there is a limit on layers, and that the thicker the colors get, the more problems with surface imperfections and dulling. Unlike with enamels, more heat does not smooth out the color. It causes the paints to go matte and become dull."

Lately I have been using Genesis heat-set paints, which work much like the Sunshine enamel pigments mixed with an oil medium. However, each color needs to first be tested on each different base coat because some of the colors crack and separate. I am continuing to work with the paints in the hopes that I can get additional depth on the powder coating, more like enamel; but for now those effects are limited.

Shana Kroiz lives and works in Baltimore. She is a co-founder and teacher at the Baltimore Jewelry Center. Previously, she was the director and founder of the MICA Jewelry Center in Baltimore, and the director of the Jewelry Center at the 92nd Street Y in NYC.

Shana Kroiz
Turquoise Gold Double finger ring
Hand carved wax, electroformed copper, powder coating with 24k fused gold, and hand-fabricated silver pin finding
4¼ x 4 x 1¼ in.
Photo by the artist

Shana Kroiz
Tulip Regal
Hand carved in wax, electroformed in copper, transparent and opaque enamels, fine silver and 24k gold foils, 18k vermeil, hand-fabricated sterling silver findings
22 x 2 x 1 in.
Photo: Hap Sakwa

Samples created using Genesis brand paint and gold foil lusters over opaque powder coat.
Photo: Shana Kroiz

Shana Kroiz
Black and Gold Double Tulip Necklace
Hand carved in wax, electroformed in copper, powder coating with 24k fused gold and silver hand-fabricated findings
24 x 6 x 1¼ in.
Photo by the artist

In the little over a year since she incorporated powder coat, Kroiz has completed five new one-of-a-kind necklaces, and countless earrings, bracelets, brooches, and rings.

oven at 355 to 400 degrees Fahrenheit. Now Kroiz reserves the paint spray booth exclusively for the final clear powder coat, which eliminates any uneven finish from the sifting technique.

Incorporating powder coat into her production line allowed Kroiz to create similar designs and styles to her electroformed enamel compositions while increasing durability—a point of concern when on the craft show circuit. At a show recently, one of the walls in her booth got knocked over, leaving three of her enamel pieces damaged and unfixable. "I love the three-dimensional quality of enameling on electroforms, but they are very vulnerable since there is no metal bezel or protective settings," says Kroiz. "This fragility always adds a level of stress to showing these pieces at craft shows."

The new powder coat process significantly decreased Kroiz's fabrication time while maintaining the aesthetic integrity of her work. Now she could offer her designs at three price points: electroformed precious metal, mid-priced

Shana Kroiz
Water Fall, 2020
Electroformed copper, powder coat
Photo by the artist

powder coat paint, and high-end enamel designs. Previously Kroiz had considered the year a success if she produced one or two significant new necklaces, four or five pairs of earrings, and a few brooches. But in the little over a year since she incorporated powder coat, Kroiz has completed five new one-of-a-kind necklaces, and countless earrings, bracelets, brooches, and rings. She is experimenting with new color palettes, opaque and transparent surfaces, and gold and silver leaf, and is developing a new body of work that incorporates her experiments with painting, sifting, and foiling.

Velina Robinson Glass is a published resin artist known for her colorful bangles, and the invention of a special color bleeding process called the Glass Effect. She is a past president of the Metals Guild of Maryland. She currently resides in Tampa, where she teaches both adults and teens at the Tampa Museum of Art.

1 Powder coat is an industrial, low-firing mix of finely ground pigment and resin particles, which is electrostatically sprayed onto a metal surface. The charged particles adhere to the metal surface until heated to 400 degrees Fahrenheit in a curing oven, resulting in a uniform, durable, smooth finish. / **2** The other concern is the potential hazard of distributing the very fine powder paint dust after the booth is taken down. Most powder coat materials are nontoxic to humans, but the particles have sharp edges, and can cause irritation to eyes and breathing passages. OSHA recommends that operators should have a complete fume hood with a fresh air supply connected to pressurize the area under the hood; this will prevent the operator from inhaling an excess amount of powder dust.

Shana Kroiz
Crescent Wreath, 2017
Electroformed copper,
18k vermeil, enamel, silver
Photo by the artist

Martha Glenny
Pin, 1992
14k yellow gold, tourmaline, diamond
20 x 55 mm
Photo: Martha Glenny and Digital by Design

TECH TEACH

Polishing to Perfection: Designing for Successful Finishing

BY MARTHA GLENNY

Domes, Curves and Flats

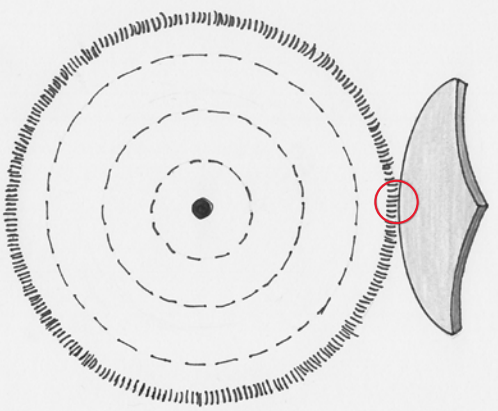
During my teaching career at George Brown College School of Jewellery in Toronto, I recommended that students be kind to their "goldsmith selves" when they were wearing their designer hat.

In polishing terms, this means making form and finishing choices that build in success, rather than presenting your goldsmith self with technical challenges. Many times, small changes to a design do not compromise the composition; they are simply translation options: a curve here instead of a flat, or a switch of position for the polished surface and the textured surface.

In this second article in the "Polishing to Perfection" series, I present three basic form options, and why you may wish to choose one over the other when designing jewelry.

This ring illustrates a careful consideration of high polish placement to heighten the ability to achieve a well-executed polish without flaws.

Martha Glenny
Ring, 1989
14k yellow gold, sterling
12 mm wide
Photo: Martha Glenny and Digital by Design



Drawing of of wheel buff and domed metal. The red circle indicates the small contact area. Image: Martha Glenny

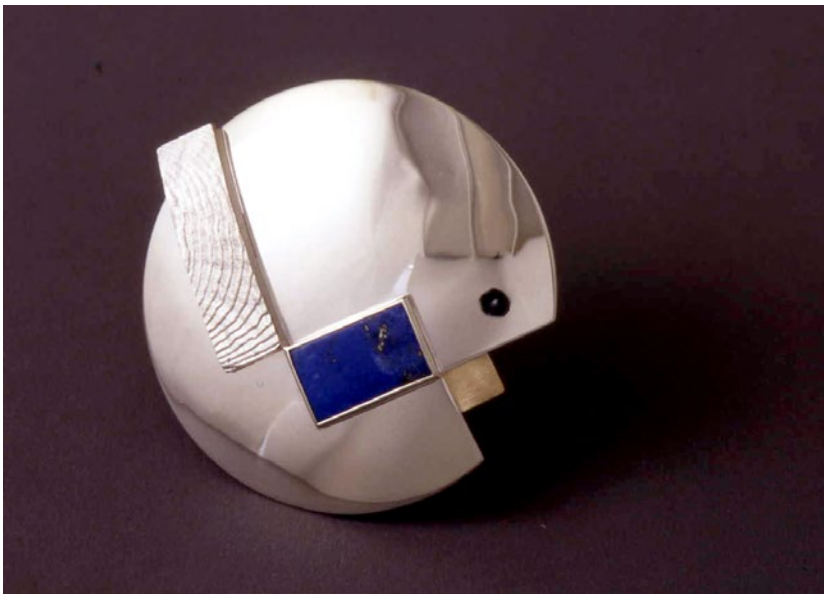
DOMED SURFACES

Domed surfaces (the convex side) are the easiest form on which to achieve a beautiful reflective high polish. This is not to say that the form is without polishing challenges, but in the context of the three forms presented in this article, it is the easiest to sand and polish. The reason is that the effort, of sanding or polishing, is concentrated on one small contact area at a time. This means you can really push the sanding tool onto the surface, and, when polishing, the wheel has all its action focused on a small contact area at a time, creating efficient results.

Avoid the trap of thinking of a dome as only a hemisphere; there are a whole range of domes from almost flat to a full hemisphere. In a design, it is often possible to translate a flat surface to a slight dome, thereby amplifying polishing success while maintaining the integrity of the design.

Martha polishing a dome on a wheel buff, from the *Polishing 101* video series.

Silver circles showing a high dome and a low dome. Photo by the artist



Martha Glenny
Pin, 1990
Sterling silver, 14k yellow gold, lapis
60 mm diameter
Photo by the artist

Below:
Student exercise, brass hollow form, George Brown College
Photo: Digital by Design

Large-diameter (5 in., 12.8 cm) cotton or muslin wheel buffs are the best tools for polishing domes. I use treated wheel buffs for Tripoli (polishing) type compounds, and untreated wheel buffs for rouge (buffing) compounds. Correct polishing procedures must be followed to avoid flaws: employing the correct amount of pressure and compound, changing the orientation of the object to the wheel with every pass, and continually moving the object on the wheel.

CURVED SURFACES

A curved surface (the convex side of a single curve) ranks second after a domed surface for ease of polish. A common example of this form is the outside of a flat band ring. As with the dome, when we use the term "curved surface," our thoughts often go to the extreme—a tube cut in half, for example—when there is a whole range of curves from which to select, including very shallow curves.

The correct way to sand or polish a curved form is to work in all directions. A mistake I often see with students is to work only over the curve. Working only over the curve will make it more difficult to see when sanding is complete, and will lead to drag lines when polishing. A good tip is to remember is that changing direction when sanding or polishing does not have to be a 90-degree, or even 180-degree change; the changes can be subtler and still be effective to avoid polishing flaws.

Martha Glenny
Earrings, 1989
Sterling silver
17 x 25 mm
Photo by the artist

Silver circles showing a high curve and a low curve.
Photo: Martha Glenny

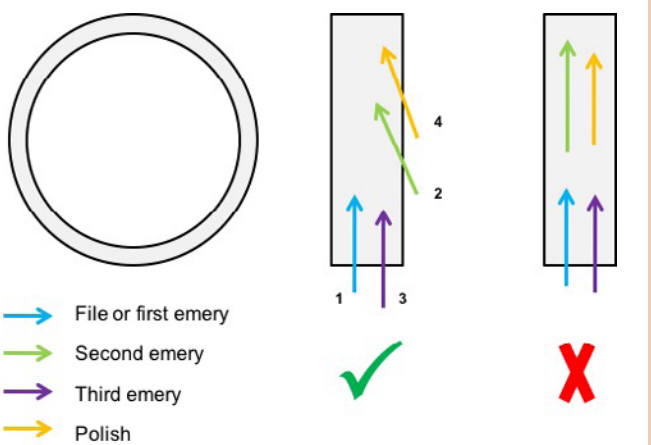
Which wheels and compounds match different metal types?

Metal alloys have very different polishing characteristics. Tool companies are a wonderful resource if you have questions about what compound is best for a specific metal, or which wheels are best for specific compounds. Visit the technical papers section of their websites or speak with a representative.

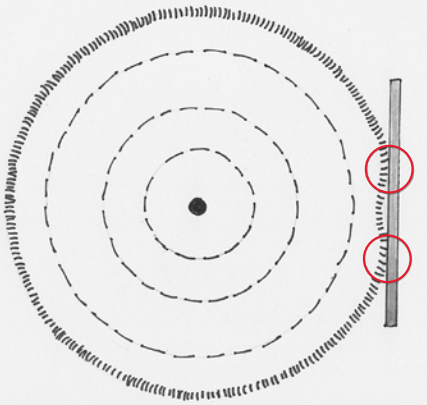
For example, Rio Grande Jewelry Supply offers a "Buffs and Compounds Selection Guide" in the Resource Center of their website.

Rio Grande
www.riogrande.com

Diagram illustrating the correct (and incorrect) sanding process on a band ring (low curve)



As with domes, large wheel buffs are recommended with the usual compounds to polish and buff curved surfaces. Do remember that on any surface—but especially a curved surface—any imperfections will disrupt the reflections and compromise the finish. Take the time to perfect the surface in the sanding stage!



Drawing of a wheel buff and flat sheet showing the areas of pressure in red. Image: Martha Glenny

FLAT SURFACES

New designers and makers will often select a flat surface as their default when constructing jewelry. After all, this is the way the metal plate comes from the manufacturer, and when designing on paper we are working in a 2D medium. However, flat sheet presents the most challenging situation for creating a perfectly executed high polish. This is not to say that you shouldn't use flat surfaces, but do use them wisely. Place flat sheets so they are completely accessible to polishing tools; most often this is at the highest point of the design. Or have flat sheets riveted to the piece so that you can polish that piece as a separate unit, then add it to the jewelry piece as a last step. Flat surfaces require different tools and methods than curved or domed surfaces. This is particularly true for new polishers. Wheel buffs, even hard wheel buffs, are a problematic choice because they work on the outer edges of a flat sheet more than the middle of the sheet. So the polished edges will be rounded from over polishing, while the middle of the sheet is showing sanding lines, or drag lines.

For flat surfaces the felt lap is a good tool choice; specifically, a rock-hard or even flint-hard felt lap. Medium or soft laps are not a suitable choice, as they act more like a wheel buff, overworking the edges. Laps are perfect for flat surfaces; however, many new polishers avoid them, as they can be a bit scary to use. Don't let yourself fall into this trap: get some laps and

Flat sheet presents the most challenging situation for creating a perfectly executed high polish.

Martha Glenny using a rock hard lap to polish a flat sheet, from *Polishing 101* video series.

Far left: Treated wheel, rock hard lap, muslin wheel with polishing compounds. Photo: Martha Glenny

Left: Well polished sterling silver flat sheet Photo: Martha Glenny

Having problems polishing?

I have two series of online videos to assist:

- My Vimeo channel, *Vimeo.com/channels/MarthaGlenny*, has a variety of exercise-based videos.
- On *YouTube.com*, search for the "Show GBC" channel. There you'll see my 14-part series of videos titled *Polishing 101*. Here's a link to the first in the series. These videos are arranged by generic jewelry forms—including domes, curves and flats.

Martha Glenny
Angle of Repose: Fibonacci/ Coreopsis, 2010
18k yellow gold,
14k white gold,
18K white gold
7 x 3 x 2 cm
Photo:
Digital by Design

Martha Glenny
Bowled Over Blake, 1998
Sterling silver,
14k yellow gold
50 mm diameter
Photo: Digital by Design

This piece of jewelry, along with the piece on page 26, illustrates a careful consideration of high-polish placement to heighten the ability to achieve a well executed polish without flaws.

practice with them. You will find they save time and improve polishing results on flat sheets. I also find that taking more and smaller steps in progression to rouge is a good strategy.

A combination of Grey Star, Lustre Bar, and then rouge on rock-hard laps works well for me. As a final step, I move to a rouge wheel buff, but have found that a smaller diameter wheel that has a 'hard' surface gives better results. There is something about the slower rotation (large wheel = faster rotation; small wheel = slower rotation) that helps prevent drags and orange-peel surface.

This is my experience; however, polishing is a very individual process, and I encourage you to experiment and find what is successful for you.

With smaller pieces (5–7 mm and less) I sometimes use a different method. It is possible to achieve a very reflective surface with micropapers. However, even with 8,000 grit paper, extremely fine sanding lines can still be visible. These can be removed with a rouge wheel buff. So why not use these papers all the time and forget the scary laps? Sanding with micropapers over large surface areas is slow and very exacting, and micropapers are expensive. Embrace the lap as your new skill for 2020!

Good finishing starts in the design process. Accept the challenge to build out technical problems and build in finishing success. Consider domes and curves as a translation option in a design; or if flat sheets are integral to the design communication, be smart in how you place and add flat sheets.

One last piece of design and finishing advice: contrast is your friend, so work it!

Martha Glenny has been active professionally since 1974. She holds a Diploma from George Brown College and a BFA from the Nova Scotia College of Art and Design University. She has worked as a full-time goldsmith in Toronto, Norway, and Halifax, and has taught jewelry and design at the Nova Scotia College of Art and Design University, Nunavut Arctic College, and from 1996 to 2019 was a full-time professor at George Brown College in Toronto.

Mill Like a Pro

Carbide 3D

With a compact footprint and a generous work area, the fast and affordable **Nomad 883 Pro CNC mill** from Carbide3D brings high-resolution milling to any workspace. Available only at Rio Grande.

RIO GRANDE®
Since 1944

75 YEAR ANNIVERSARY

For your bench. At your side.

riogrande.com 800.545.6566 #RioJeweler